BOTANICAL GAZETTE.

VOL. X. APRIL, 1885. No. 4.

Torreya taxifolia, Arnott.

A REMINISCENCE.

BY A. W. CHAPMAN.

[Being the only survivor of the quaternary band engaged in the erection of the Torrey monument, I have thought that I might perform a service acceptable to the readers of the GAZETTE, by placing before them a record of the circumstances and events connected with it. The accompaning map will, I hope, serve to assist in forming a correct idea of its surroundings, and the appended list of plants, exhibiting a strange intermingling of low country and mountain forms, will not be uninteresting to the botanist.]

Fifty years ago, on one of those calm, hazy October evenings, peculiar to the climate of Florida, the quiet of the pleasant town of Quincy was interrupted by the rapid approach of a carriage with attendant outriders, which, having made part of the circuit of the public square, drew up before my office, and a gentleman of middle age, spare habit, light hair, and blue eyes, came forth and introduced himself as Mr. Croom, of North Carolina.

This was the commencement of my brief intercourse with Hardy B. Croom, the discoverer of *Torreya;* for, as is well remembered, a year afterwards he was lost at sea, with all of his family, on the passage from New York to Charleston.

Of his personal traits it is needless here to say more than that he belonged to that class of wealthy and intelligent southern gentlemen, whose homes, renowned for their unostentatious hospitality, were the abode of all that is most charming in the refinements of domestic life; but which now, by impoverishment resulting from disastrous civil conflict, and consequent change of social customs and duties, and by the invasion of ruder manners and looser ethics, have entirely disappeared.

At that time I was a mere tyro in botany, groping among the "*andrias*" of Eaton's Manual, attracted thereto by the strange vegetation of a new and unexplored country that met my view on

all sides, and had recently entered upon a friendly and instructive correspondence with Dr. Torrey, which was continued until his death.

And here I may remark, parenthetically, that judging from a list of plants, still preserved, that I had sent to him, one might fancy that the distinguishing characters of genera and species, notably of *Carex* and *Scleria*, were not then quite so clearly defined as they are now. Indeed, the student of to-day, with a royal road before him, and all inequalities removed, can not appreciate the difficulties encountered by a lone botanist in the wilds of Florida fifty years ago.

Mr. Croom was then on one of his annual journeys from New Berne, North Carolina, the residence of the family, to his plantation in the adjoining county of Leon; but previously to settling permanently in that county, he had rented a plantation on the west bank of the Apalachicola river opposite the calcareous cliffs at Aspalaga on the east bank, which at that time were covered by a dense grove of *Torreya*, and it was here, probably in 1833, that he first saw it.

Recognizing it as likely to be new, at least to our Flora, he sent a flowerless branch to Mr. Nuttall, who briefly noticed it in the *Journal of the Philadelphia Academy*, Vol. VII, p. 96, with the suggestion that it might be the *Taxus montana*, of Mexico.

At the time of our first meeting in 1835 it appears that he had made the acquaintance of Dr. Torrey in New York, and had supplied him with specimens in flower and fruit; and it was during the previous summer, and at the latter's request for additional information and material, that my connection with the tree commenced.

His first impressions were, I believe, that it might be a species of *Podocarpus*, but these, after a minute analysis of all its parts, he soon abandoned, and came to the conclusion that it constituted the type of a new genus among the Taxoid Conifers, a conclusion also entertained by his friend and correspondent, Dr. Arnott, of Edinburgh, to whom he had communicated specimens together with a report of his analyses, and the latter, after disposing of the *Torreya* of Sprengel, which was proved to be a species of *Clerodendron*, and ignoring sundry lesser Torreyas, transferred the name to the Florida tree, and published a full description and figure of it in *Annals of Natural History*, Vol. I, p. 126, under the name of *Torreya taxifolia*.

Since then, other species, from widely distant regions, have been added to the genus, which, like the Florida tree, appear to

be confined to restricted localities. Ours occupies a narrow strip of land extending along the east bank of the Apalachicola river, from Chattahooche on the north, to Alum Bluff on the south, a distance of about twenty miles, and forming a continuous forest, but in detached and often widely separated clumps or groves, generally mingled with, or overshadowed by, magnolias, oaks and other native trees. There are, also, a few trees at the southern extremity of Cypress Lake, three miles west of the river. It is a wild, hilly region, abounding in rocky cliffs and deep sandy ravines ("spring-heads,") and unlike in scenery and vegetation any other part of the low country known to me. To these cliffs, and to the precipitous sides of these ravines, the tree appears to be exclusively confined; for it is never seen in the low ground along the river, nor on the elevated plateau east of it, nor, indeed, on level ground anywhere. Hence, although the suggestion may appear a startling one, were the trees of the whole region growing side by side in one body, I estimate that an area of a few hundred acres would suffice to contain all of them.

It is seldom more than forty feet high, and eighteen inches in diameter, and of a brighter green than is exhibited by most trees of the order. Its branches are in whorls, and spread horizontally, gradually diminishing in length upwards, in the manner of the northern hemlock. It is called *Savin*, or *Stinking Cedar* (the latter on account of its strong and disagreeable terebinthine odor when bruised), names also applied, I believe, to the Florida Yew (*Taxus Floridana*), a rarer tree, which is sometimes seen growing with it.

In unskillful hands it seldom survives removal, and therefore is rarely seen as a shade-tree around dwellings, or as an ornamental tree on lawns, and the only successful attempts in this regard that occur to me were made by the late Judge Dupont in Quincy, and by Mr. Croom in the grounds of the Capitol at Tallahassee, where, I am informed, two or three of the trees still survive.

But its chief value is due to the remarkable durability of its wood when exposed to the vicissitudes of climate; for it is credibly reported that some fences constructed of it sixty years ago still remain in sound condition. In consequence of this peculiarity it is now extensively employed by the inhabitants of the surrounding country for posts, shingles, and other exposed constructions. In view of these facts, the future of our *Torreya* is a matter calculated to excite very grave apprehensions. A tree possessed of such valuable qualities, occupying an area so limited in extent, and in the midst of a population where the old rule of

> "Let him take who has the power,
> And let him keep who can"—

has unlimited sway, is destined, it is to be feared, to ultimate extinction.

Let us indulge the hope that the interest which is beginning to be manifested in regard to the preservation of our forests generally, may result in measures statutory or otherwise for its preservation.

SELECTIONS FROM THE BOTANY OF THE REGION OF THE TORREYA.

Plants peculiar to the Region.

Calamintha dentata.
Carex Baltzellii.
Taxus Floridana.
Torreya taxifolia.

Plants not seen by me elsewhere South of the Mountains of Georgia.

Aristolochia tomentosa.
Cornus alternifolia.
Dentaria laciniata.
Calycocarpum Lyoni.
Zanthorhiza apiifolia.
Spiræa opulifolia.
Thalictrum anemonoides.
Trautvetteria palmata.
Viola Muhlenbergii, var.

Plants not seen by me elsewhere in Florida.

Actinomeris squarrosa.
Archangelica hirsuta
Bumelia lycioides.
Carex rosea.
Cherokeensis
Halei.
gynandra.
Clematis Viorna.
Croomia pauciflora.
Cynoglossum Virginicum.
Epigæa repens.
Euonymus atropurpureus.
Eupatorium ageratoides.
Forrestiera acuminata.
Gonolobus Baldwinianus.
Hepatica triloba.
Hypericum nudiflorum.
galioides, var.
Lupinus perennis, var.
Luzula campestris.
Magnolia macrophylla.
Philadelphus grandiflorus.
Phryma leptostachya.
Polygala Boykinii.
Rudbeckia laciniata.
Sabbatia gentianoides.
Silene Baldwinii.
Zornia tetraphylla.

EXPLANATION OF MAP.—The localities occupied by *Torreya* are indicated by heavy shading, chiefly along the bluffs.

Notes on Naiadaceæ.

BY THOMAS MORONG.

POTAMOGETON PAUCIFLORUS, Pursh, var. CALIFORNICUS.—A vigorous growth, with stems 12 to 18 inches high, flattened or a little winged, half a line broad below: leaves 1 or 2 inches long, nearly a line wide, 3 to 5-nerved, the midrib thick and prominent as in *P. obtusifolius:* peduncles erect, thick, clavate: spike containing sometimes as many as 12 roundish fruits, which are crested or undulate and frequently shouldered on the back, commonly angled on the face, varying from ¾ to 1 line in length.

The form is well distinguished by its stout stem, large and strongly marked leaves, and its spikes of large and numerous fruit.

San Diego County, California. *S. B. & W. F. Parish.*

ZANNICHELLIA PALUSTRIS, L.—The distinctions founded upon the presence or absence of peduncles and pedicels (such as *Z. pedunculata*, Reich., *Z. palustris*, L. var. *pedicellata*, J. Gay, var. *pedunculata*, Gray) will not hold good, as these distinctions may all be noted occasionally upon the same plant; but the following form appears well marked:

Var. MURICATA.—Fruit largely or entirely muricate, sometimes armed with distinct and numerous teeth.

Texas, *J. Reverchon.* San Diego Co. Cal., *Parish.*

NAIAS MAJOR, All. var. GRACILIS.—Internodes long (1 to 3 inches), and nearly naked, with only a few teeth above: leaves very narrow, less than ½mm. broad, with 15 to 24 large teeth on the margin, dorsal teeth few: the teeth are of the *N. major* type, having a many-celled base, and a yellowish 1-celled spiny tip, curved upwards: the sheaths bear two or three teeth on each side: fruit quite small for the species, not over 3mm. long, the surface sculptured with about 25 rows of nearly square or irregularly oblong reticulations. The whole plant, at least when dry, is purple tinged.

The aspect of this plant is so unlike that of the type, that I should call it a new species if any distinctive specific characters could be clearly perceived. It is a good sub-species.

Florida, *A. H. Curtiss.* Distributed as No. 2705.

NAIAS FLEXILIS, Rostk. and Schmidt.—A polymorphous species, found throughout N. America and Europe, and probably in Asia.

The teeth on the margins of the leaves are one-celled; on the sheaths they are often raised above the margin by a basal prominence of several cells. This species occurs in forms with leaves narrow and broad, linear and abruptly acute, and linear-lanceolate, tapering to a sharp point; also in plants which are small, bushy and densely leaved and branched, as well as in forms a foot or more high and quite slender. The following is an extreme form, almost distinct enough to be ranked as a sub-species:

Var. ROBUSTA.—Stem stout, few-leaved, sparsely branching, elongated: leaves linear, 1½–2mm. broad and 10 to 15mm. long,

flat, abruptly acute. I have found it rising to the surface in still ponds, in water 4 to 6 feet deep! Sterile plants only seen.

Eastern Mass. Also collected by *L. H. Bailey, Jr.*, in Mich., and *C. Wright*, in Texas.

NAIAS MICRODON, A. Braun.—Sheaths and teeth similar to those of *N. flexilis*, with which it was formerly classed by Braun, except that the teeth are very minute and sometimes very numerous (30–100): leaves less than 1mm. broad, 5 to 8mm. long, somewhat recurved, undulate, not revolute. The species is mainly characterized by its fruit, which is very short (1 to 2mm.), sculptured on the surface by 16 to 20 rows of nearly square reticulations, and scarcely shining. The fruit of *N. flexilis* is 2½ to 3mm. in length, conspicuously smooth and shining, especially in the denuded nutlet, the superficial marking indistinct in mature fruit, but consisting of about 40 rows of roundish-square or irregular shallow reticulations.

Perdinales river, Texas, coll. *Lindheimer*, 1847.

By the courtesy of the curator of the Chapman Herb. at Columbia College, Prof. N. L. Britton, I have been permitted to see the original specimen of Chapman's *N. flexilis*, var.? *fusiformis*, and I fully agree with Braun that it is *N. microdon*, so that our localities for this species in N. America must include Florida. Our form of the species is classed by Braun as *N. microdon*, var. *Guadalupensis*, it having been originally collected by Duchassaing at the French West India Island Guadaloupe.

Biology of the Conjugatæ.

BY WM. TRELEASE.

The common Brook-Silks (*Spirogyra* and *Zygnema*) have served an excellent purpose in the biological laboratory because of the large size of their cells, and the distinctness with which the parts of the latter stand out; and the completeness of their reproductive processes, which can be followed even by students who have had little training in laboratory manipulations. Yet the details of their vital processes, and even of their structure, are known to comparatively few who use them, and the statements concerning both are scattered through isolated papers, of recent publication, by Strasburger, Schmitz, and others, which are still inaccessible to most teachers. Bringing the most impor-

tant of these facts together, and verifying them by observations on something more than 130 species, has been a task well performed by Professor Gay, of the School of Pharmacy at Montpellier, whose local monograph of the group[1] is a worthy model for monographers elsewhere.

Aside from the behavior of the nucleus in cell-division, which Strasburger has clearly elucidated in his "Zellbildung und Zelltheilung," the most interesting part of their history relates to the structure of their chlorophyll bodies, and to their reproduction.

By allowing the cells to lie for a time in a saturated solution of picric acid, the protoplasm of the well known chromatophores is sufficiently contracted, without distortion, to show its reticulated structure with a high power, and this is rendered still more evident by such contracting reagents as alcohol.

The same treatment brings out the so-called pyrenoids, minute bodies .5–.15μ in diameter, which their discoverer, Schmitz,[2] homologizes, rightly or wrongly, with the nucleoli, which divide as the chromatophores enlarge, and whose division precedes that of the chlorophyll bands in which they lie. Their position is indicated, even before they are seen, by the clusters of starch grains which always surround them, and which rarely occur away from them, as though they were instrumental in forming the grains. A good method for the demonstration of the latter is indicated in the employment of acetic acid, in which the cells are placed for a few moments to remove much of the protoplasmic structures, after which they are rinsed in water preparatory to examination.

Containing a nucleus, chromatophores, and pyrenoids, which multiply apparently independently one of the other, the cell is fast losing its claim to recognition as the unit of plant structure.

The family Conjugatæ is of peculiar interest in its bearings on general biology, since in it appears not only sexuality, but the differentiation of the sexes. From plants which are exclusively apogamic (*Gonatonema*, *Spirogyra mirabilis*), a series is traced through the Desmids, where similar vegetative cells conjugate, and the Mesocarpeæ, where, though still similar, their protoplasm undergoes a rearrangement, to the Zygnemaceæ—

[1] Fr. Gay: Essai d'une Monographie locale des Conjuguées. Montpellier. Boehm et Fils, 1884. 8° 110 pp. 4 pl.

[2] Chromatophoren der Algen.—Verh. naturh. Ver. d. preuss. Rheinl. u Westf., 1883.

Zygnema, *Spirogyra longa*, *S. inflata*, *S. conspicua*, and *S. punctata*, illustrating an increasing sexual differentiation, that culminates in *Sirogonium sticticum*, in which there is not only a difference between the mother cells of the gametæ, but a difference in size between the latter after their renovation previous to union.

Some New Grasses.

BY GEO. VASEY.

ELYMUS ORCUTTIANUS.—Culms generally several from one root, 2 or 3 feet high, rather slender, leafy; nodes 4 to 5: leaves 8 to 10 inches long, erect but not rigid, narrow and more or less involute when dry, scabrous on the margins, upper leaf equalling or exceeding the culm; sheaths striate, smooth; ligule a short ciliate line or nearly obsolete: spike 4 to 6 inches long, erect, loosely flowered, with 15 to 20 spikelets, two or frequently only one at each joint, mostly flat and 2-ranked: spikelets 5 to 7-flowered; outer glumes linear-lanceolate, rigid, long-pointed, 4 to 6 lines long, one or indistinctly three-nerved, equalling or exceeding the lower flowers; lower flowering glumes 4 to 5 lines long, rigid, lanceolate, acuminate, rounded and smooth on the back, finely punctate, 5-nerved on the inside, the point scabrous; the upper flowering glumes gradually shorter and less pointed, and more scabrous above; palet $\frac{1}{4}$ to $\frac{1}{3}$ shorter than the glumes, 2-toothed at apex, 2-keeled, the keels ciliate.

This is one of those species which may with almost equal propriety be classed in *Elymus* or *Agropyrum*. The narrow rigid glumes, and the general position of the spikelets seem best to refer it to *Elymus*, although in the weaker plants the spikelets are single.

Collected near San Diego, California, by *C. R. Orcutt*.

AGROPYRUM TENERUM.—Culms in tufts or patches, without running rootstocks, apparently annual, about 3 feet high, erect, smooth: leaves narrow, one or two lines wide, 3 to 6 inches long; sheaths striate, smoothish; ligule short: spike slender, cylindrical, 4 to 6 inches long, one or two lines wide, with the spikelets $\frac{1}{3}$ to $\frac{1}{2}$ inch distant, sometimes wider and with the spikelets closer; axis scabrous: spikelets 3 to 5-flowered; outer glumes 5 to 6 lines long, rigid, lanceolate, acute or awn-pointed, strongly 5-nerved; flowering glumes lanceolate, acute, 4 to 5 lines long,

rounded on the back, smooth or smoothish and with the nerves indistinct below, above conspicuously 5-nerved and scabrous, terminated with a stiff, straight awn $\frac{1}{2}$ line to 2 lines long; palet nearly as long as its glume, entire or obtusely 2-toothed at the apex, the keels ciliate or hispid-ciliate.

This has been named in some collections *Triticum* (*Agropyrum*) *repens*, var. *tenerum*. It is often difficult to distinguish it from that species except in wanting the running rootstock. It is common throughout the Rocky Mountains, and in bottom lands it is often cut for hay, of which it makes an excellent quality.

Another very common *Agropyrum* of the mountains and plains, also valuable for forage and hay, and known among stockmen from Montana to New Mexico as "blue stem, or blue grass," is the *Agropyrum glaucum*, R. & S. of which the following is a description:

AGROPYRUM GLAUCUM, R. & S.—Culms from running rootstocks, 1 to 3 feet high, erect, rigid, smooth, with about 3 erect, rigid, narrow leaves, 4 to 6 inches long: spike distichous, 4 to 6 inches long, 4 to 6 lines wide, generally close or compact: spikelets 5 to 9-flowered, smoothish or sometimes pubescent; outer glumes slightly unequal, narrowly lanceolate, acuminate or awn-pointed, the lower 4 to 5 lines, and the upper 5 to 6 lines long, the lower 1 to 3-nerved and the upper about 5-nerved, the lateral nerves mostly all on one side of the midrib; flowering glumes 4 to 6 lines long, lanceolate, obtusish, or acute, or awn-pointed, usually sparsely pubescent, 5-nerved, the nerves indistinct below; palet about equalling its glume, rather acute, slightly bidentate, the keels hispid-ciliate, the back sparsely softly pubescent.

The whole plant is usually glaucous. In rich soil the spikelets are sometimes double at the joints.

Lowest Germination of Maize.

BY E. LEWIS STURTEVANT.

At the New York Agricultural Experiment Station we have obtained the following data relating to the germination of maize. The temperatures given are of a thermometer with the bulb in with the seed used, and each degree carefully corrected with a standard. Readings were taken hourly from 7 A. M. to 11 and 12

P. M., as a check upon the accuracy of our apparatus, which was designed to keep at a constant temperature with a variation of but two degrees. Our success with the lowest temperatures was perfect. The higher temperatures were with trial apparatus, and had a wider range until experience led to perfecting.

The following table gives the hour at which first germination was observed at the various temperatures, the seed from the same ear for each variety:

	Exp. IV. 41°.5 to 43°.7	Exp. III. 43°.5 to 47°.8	Exp. III. 43°.5 to 49°.6	Exp. II. 45°.5 to 50°.1	Exp. I. 48°.5 to 55°.5
Dent Corn.					
Adams' Early	233	.....	.....	180	142
Chester Co. Mammoth	233	264	.....	168	142
Flint Corn.					
Waushakum	331	336	.....	228	142
Eight-rowed White	331	.....	.....	216	150
Soft Corn.					
Tuscarora	378	.....	408	228	161
Zuni Blue	431	.....	.....	228	185
Pop Corn.					
White Pearl	378	336	.....	228	142
Amber Rice	378	.....	.....	228	142
Dwarf Golden	498	.....	.....	228	142
Sweet Corn.					
Stowell's Evergreen	452	.....	504	228	195
Narragansett	498	.....	.....	300	209

Twenty-five seed of a kind, in duplicate trials, were used. Yet even with this number we did not succeed in eliminating the individual variability, one pocket furnishing germinating seed many hours before another. Thus, one trial with Naragansett Sweet gave first germination of one seed in 209 hours, its duplicate in 222 hours in Experiment I; and in Experiment IV the same seed germinated in one trial in 498 hours and its duplicate in 523 hours. Dwarf Golden pop, in Experiment IV, germinated in 498 hours in one trial and 738 hours in its duplicate.

In Experiments I and II, one hundred per cent. germinated, the trials extending 281 hours in I and 408 hours in II. Expeperiment III continued 1008 hours, and Experiment IV 708 hours, the average germination after this interval being as below, but the ungerminated seeds in all cases sound at the conclusion of the trial.

PER CENT. SEEDS GERMINATED, AND SOUND BUT UNGERMINATED IN EACH EXPERIMENT.

	Exp. I. 281 hours.	Exp. II. 408 hours.	Experiment III. 1008 hours.		Experiment IV. 708 hours.	
	Germ.	Germ.	Germ.	Ungerm.	Germ.	Ungerm.
Dent Corn.						
Adams' Early	100	100	.....	.....	100	.....
Chester Co. Mam'th	100	100	100	.....	100	.....
Flint Corn.						
Waushakum	100	100	92	8	100	.....
Eight-rowed White	100	100	.....	.....	84	16
Soft Corn.						
Tuscarora	100	100	84	16	50	50
Zuni Blue	100	100	.....	.....	74	26
Pop Corn.						
White Pearl	100	100	80	20	44	56
Amber Rice	100	100	.....	.....	46	54
Dwarf Golden	100	100	.....	.....	18	82
Sweet Corn.						
Stowell's Evergreen	100	100	84	16	62	38
Narragansett	100	100	.....	.....	60	40

We have thus carried the lowest temperature at which maize will germinate to below 43°.7 F. for all the form species. It is probable that further trial will place the lowest temperature at 42° or below, but the difficulty of keeping an unquestioned record between close limits for a long period is very great. In Experiment IV we succeeded for 29½ days, when repairs to our water service necessitated the concluding.

The apparatus used was a double box, made especially tight, and lined on three sides with a flat copper pipe, through which spring water, at a temperature of 36°, was kept constantly circulating. A thermostat within operated upon a clock outside through electrical communication, and when the temperature dropped below the point at which it was set, shutters were opened which admitted the warm air of the room until the thermostat again closed them through the agency of the clock. The germinator was a copper box, containing water, and fitted with cloth pockets, and a thermometer passing through a cork inserted in the refrigerator box had its bulb included within the pockets along with the seed, and its readings served as a check upon the working of the thermostat.

GENERAL NOTES.

A Correction.—A correspondent, Mr. Oliver Farwell, of Clifton, Mich., calls attention to an oversight in my article on "The Menominee Iron Region and its Flora." It is stated that *Habenaria rotundifolia*, Richardson, is not mentioned in any catalogue of Michigan plants. It is given in that of Wheeler & Smith, as *Orchis rotundifolia*, Pursh, and as habitats, "Flint, Mich., and shore of Lake Michigan in Wisconsin."—E. J. HILL, *Englewood, Ill.*

The Palms of California.—Recent correspondence on the palms of California has resulted in my becoming aware that *Brahea glauca* of seedsmen, is undoubtedly the *Erythea armata* (Watson) of the adjacent borders of Lower California, while *Brahea Roezlii* (Wendland) of nurserymen, is also a synonym of the same, and not of *E. edulis* (Watson), as had been supposed. *Washingtonia robusta* (Wendland) is found to have originated in Lower California, instead of Sacramento valley, where there are no indigenous palms. I am indebted to George A. Purdie, of Boston, for information not otherwise accessible to me, and which has led largely to the above results, and any one in a position to give further information regarding these species would confer a favor by addressing C. R. ORCUTT, *San Diego, Cal.*

Some Indiana Plants.—There are a few plants to add to the list of those already published for Indiana, or additional stations. All are from Lake or Porter County:

Hepatica triloba, Chaix. Hobart. Generally on north slopes.—*Cornus Canadensis*, L. Pine Station.—*Aphyllon fasciculatum*, Torr. & Gray. In sand by shore of Lake Michigan, Pine Station. Usually parasitic on roots of species of Artemisia.—*Potamogeton pulcher*, Tuck. In "sloughs" at Pine Station. Leaves not as large as those of species described in Gray's Manual, resembling those of some forms of P. natans. The fruit is earlier, specimens with mature fruit having been collected June 21. P. natans fruits in August or later. This peculiarity may call attention to it. This adds another locality to the few already given for this species. In Gray's Manual it is ascribed to E. Mass., and ponds on hills north of St. Louis, and Georgia. In *Torrey Bulletin*, River Head, L. I., Mr. Morong writes that he has seen it from Delaware and East New York.—*Carex arida*, Schw. & Torr., and *C. squarrosa*, L., at Wheeler's.—*Festuca ovina*, L. Banks of Calumet river. Hammond. A locality showing many evidences of former occupation by Indians, such as arrow-heads, flint chips, broken pottery and teeth of deer. If not indigenous, probably naturalized long ago, as it was on uncultivated timbered ground.—*Vaccinium Pennsylvanicum*, Lam. A noticeable variety of this is found at Hammond. Leaves glaucous, as in V. vacillans: fruit black, without bloom, somewhat depressed globular and very sweet. Shrub mostly taller than the common form and growing with it. Seemingly affecting rather damper and richer soil. The fruit ripens at the same time as that of the blueberry. Having noticed it first while gathering blueberries, I am not able to say whether it differs in flower.—*Thalictrum anemonoides*, Michx. Flowers greatly doubled, of 20 to 30 purplish

sepals, alternating in whorls, and very handsome. Woods near Hobart.—*Rubus triflorus* Richardson. White fruited. Quite a patch in the pine woods at Pine Station.—*Calopogon pulchellus*, R. Br. White flowered. Clarke Station.—E. J. HILL, *Englewood, Ill.*

Reproduction in Ferns.—Mr. W. T. Thiselton Dyer, in *Nature*, refers to a most interesting discovery recently made by Mr. E. T. Druery. A variety of *Asplenium filix-fœmina* was discovered upon which the sporangia developed into prothallia bearing antheridia and archegonia. Mr. F. O. Bowen also found an *Aspidium* in which the apex of the pinnules developed in the same way. Aposporous ferns are looking very strongly towards phanerogams. The same writer sums up the progress of discovery in reproduction of ferns in the following concise and instructive way: Observed seedling plants near parents, Gerarde (1597); Sporangia, Cæsius (1648); Spores, Cole (1669); Hygroscopic movements of sporangia, Ray (1686); Raised seedlings from spores, Morison (1715); Prothallium, Ehrhart (1788); Germination of spores, Lindsay (1789); Development of prothallium, Kaulfuss (1827); Antheridia, Nägeli (1844); Archegonia, Suminski (1846); Apogamy, Farlow (1874); Apospory, Druery (1884).

EDITORIAL NOTES.

MR. SERENO WATSON is collecting in Guatemala.

MR. F. LAMSON SCRIBNER, in Proc. Philad. Acad., p. 289, 1884, describes, with plate, a new species of *Cinna*.

A NEW WORK on methods of bacteria investigation as conducted by the most eminent bacteriologists is announced by Cassino & Co. The author is Dr. C. S. Dolley.

FRANK BUSH and Cameron Mann have published a supplement to their catalogue of the plants of Jackson County, Missouri, which carries the number of species from 609 to 905.

HEDWIGIA, the German cryptogamic journal, edited by Dr. Winter, has just completed its twenty-third volume, and announces that it will hereafter be much enlarged and improved, and the subscription price increased to 8½ marks.

THE LIBRARY of the late Charles Downing, the eminent horticulturist, has become the property of the Iowa Agricultural College by bequest. This is a valuable acquisition, and a choice compliment to the horticultural department of the college.

DR. M. C. COOKE announces in *Grevillea* that he is now engaged on a monograph of the genus *Polyporus*, to be based upon a personal examination of each species so far as possible, and to contain a full description of the species with spore measurements and critical notes. A preliminary list of 261 species is given.

WE LEARN from *Science* that Montreal is to have a fine botanic garden under the joint control of McGill University and the Horticultural Society. Professor D. P. Penhallow is entrusted with controlling influence in the execution of the plans.

THE FIFTEENTH CENTURY of Ellis's North American Fungi is devoted to the parasitic species. There are 34 species of *Puccinia*, 18 of *Æcidium*, 7 of *Uromyces*, 17 of *Peronospora*, and 7 of *Entyloma*, the remaining species being distributed to 9 genera.

IN THE JOURNAL OF BOTANY for March, Mr. F. Townsend presents an illustrated paper to prove "that the pale in the floret of grasses is the homologue of the ochrea and utriculus in Carex, and that the latter is a single floral envelope, therefore the pale is also single."

DR. J. T. ROTHROCK, at a recent meeting of the Botanical Section of the Philadelphia Academy, called attention to the internal cambium ring in the stem of *Gelsemium sempervirens*. The result was that the pith was constantly being encroached upon and finally almost disappeared.

OWING TO WORK for the New Orleans Exposition, Mr. A. H. Curtiss was prevented last season from preparing a new fascicle of Florida plants. He has been able, however, to collect sufficiently to offer what may be called a second issue of his first fascicle. It contains 240 species and is sold for $18.

DRS. ASA GRAY and W. G. Farlow have been on a collecting tour through Mexico by way of the City of Mexico and Vera Cruz, and are now at Los Angeles, Cal., which is to be their principal stopping place. On the way to Vera Cruz they found the flora and scenery remarkably fine.

MR. JOHN ROBINSON read a very interesting paper last June before the Essex Institute, and published in their *Bulletin*, entitled "Botany in Essex County." The record is a rare one, and with such names as Cutler, Oakes, Pickering, Osgood, and Russell, it is no wonder that the science became popular.

THE WESTERN DRUGGIST comes to us from Chicago with a department of "Botany and Microscopy," under the direction of Prof. E. S. Bastin. The chief article under it is entitled "Directions for Preparing and Mounting Sections of Stems and Leaves." In another place Prof. Bastin gives an illustrated account of plant hairs.

THE JOURNAL OF BOTANY always brings to us descriptions of new species of plants. The February number contains descriptions of five new Desmids (with plate), a new *Carex* from Sumatra, a new *Loranthus* from China, and four new species of *Selaginella*. The synopsis of the last genus by Dr. Baker has now reached 232 species.

THE FIRST NUMBER of *Nuovo Giornale Botanico Italiano* for 1885 contains a continuation of the Veronese flora, by A. Goiran, a reply by F. Tassi to Prof. Luigi Macchiati in reference to the effect of anesthetics upon flowers, and an anatomical description (with four plates) of the inflorescence of the female flower of *Dioon edule* (a Cycad) by G. Cugini.

MR. J. REVERCHON will collect extensively in Western Texas this season, and if sufficiently encouraged, will undertake in subsequent years a thorough exploration of that very interesting region. We hope that all botanists who can will promise to Mr. Reverchon their share of support in this great undertaking. His address is 411 Houston street, Dallas, Texas.

IN THE CURRENT VOLUME of the Proceedings of the Philadelphia Academy, Dr. Gray makes some remarks upon Mr. Meehan's discovery of the retraction of the anther-tube in *Helianthus*. It is similar to that which takes place in the thistle tribe generally, but Dr. Gray claims that it is the "result of automatic or irritable shortening of the filaments," and not of the "elasticity of the filaments," which Mr. Meehan had suggested.

THE FIRST TWO numbers of the *Journal of the New York Microscopical Society* give excellent promise for this new venture. The number of journals shows that if in America microscopical science has not sent its roots down very deep, they are at least spreading widely. The new claimant for favor is well gotten up and well printed, and its matter interesting and appropriate. Only nine numbers a year are to be issued. We shall look to it for some valuable contributions to knowledge.

DR. A. C. ABBOTT, of Baltimore, Md., has offered a series of twelve slides of pathogenic bacteria, which we have examined with more than usual interest. They have been prepared from material furnished by Dr. G. M. Sternberg, the most noted American bacteriologist, and include several slides of *Bacillus Anthracis*, *B. tuberculosis*, and a number of species of *Micrococcus*, including that of swine plague. The fine slide of *B. Anthracis* showing spores will be especially appreciated by morphologists.

WALTER GARDINER, in a recent number of *Nature*, comments upon Dr. Schwarschmidt's paper on continuity of protoplasm, mentioned in our last issue. Among other things he points out that several eminent investigators have been led astray by the tests they have relied upon to demonstrate protoplasm in intercellular spaces. He believes that its existence has not yet been demonstrated, and that the substance mistaken for it is mucilage. As to interlamellar protoplasm he considers it simply impossible, as does also Russow.

LECLERC DU SABLON has studied the mechanism, as we learn from the *Botanisches Centralblatt*, by which the leaves of certain trees, e. g., beeches, oaks, hornbeams, etc., are retained on the tree long after they are dead. At about the time the leaves begin to change color, the base of the leaf-stalk for some two or three millimeters becomes lignified, and the cells and vessels thickened, offering complete obstruction to the passage of water. The leaves then dry up and remain so. They are pushed off in the spring by the swelling of the living tissue just underneath.

THE BULLETIN of the Royal Botanical Society of Belgium, for 1884, contains a paper (with two plates) by E. Bernimoulin, upon the division of the nuclei in *Tradescantia Virginica*. The breaking up into worm-like filaments is quite remarkable and the plant so easily obtained that these observations could

be readily verified in almost any laboratory. The parts used are pollen mother-cells, stamen hairs, and shreds of young epidermis, and the method of their treatment is fully explained. In the same volume a synoptical catalogue of the mycologic flora in the neighborhood of Brussels is given by E. Bommer and M. Russeau. It occupies (with full index) some 350 pages.

CURRENT LITERATURE.

Bulletin of the California Academy of Sciences. No. 3. February, 1885.

This number is chiefly made up of botanical papers of considerable importance, and contains thirteen botanical plates, most of them colored. Mr. Edward Lee Greene, in a paper entitled "Studies in the Botany of California and Parts Adjacent," describes many new species and some new genera, and gives a synopsis of certain groups. A new *Vancouveria* from Oregon is described, five new species of *Eschscholtzia*, and two new genera of Cruciferæ, *Heterodraba* and *Athysanus*. The former is *Draba unilateralis*, M. E. Jones, and the latter *Thysanocarpus pusillus*, Hook. A synopsis of *Sidalcea* is given with five new species. *Hosackia* is represented by four new species, and *Ribes* by two. A synopsis of *Pentachæta* is given and many new Compositæ described, among which is a new genus called *Crockeria*. The sections *Diplacus* and *Eunanus* of *Mimulus* are raised to generic rank, the latter containing 20 species, and then follows a synopsis of *Mimulus*. The only trouble with regard to certain distinctions drawn under *Mimulus*, *Eschscholtzia*, etc., is that one must have fresh specimens for determination, a thing so inconvenient as to largely preclude the use of such characters. *Polygonum Douglasii* and *P. Engelmanni* are two new species separated from *P. tenue*.

In the same number, Mary K. Curran gives a list of plants described by Drs. Albert Kellogg and H. H. Behr, with an attempt at their identification.

Mr. E. L. Greene also describes eight new species of the genus *Astragalus*.

Mr. H. W. Harkness gives a list of the Fungi of the Pacific Coast, with descriptions of several new species, and calls attention to certain generic names which are used twice, principally once among phanerogams and again among fungi, such as *Antennaria*, *Lestadia*, *Phyllactinia*, *Clypeola*, *Eurotia*. In the last two instances the termination is *um* in the case of the fungus, too close a resemblance, but not so absolutely inexcusable as in the other cases given.

Altogether, the *Bulletin* surprises one with its evidence of great botanical activity upon our Pacific Coast.

Canadian Filicineæ. Macoun & Burgess. From the Trans. Roy. Soc. Canada. Read May 23, 1884.

This is a sumptuously printed pamphlet of over sixty pages, and is intended to be all that is necessary for a Canadian pteridologist. There are 64 species given, with references to literature, synonymy, descriptions, stations and collectors. A history of the subject, remarks upon distribution, and a short account of the life history of Ferns prefaces the synopsis. Two tables give some interesting views as to distribution. The first is made upon the basis of Mr. Redfield's division of the North American species into six great classes, the 64 Canadian species being distributed as follows: Cosmopolitan, 4; Boreal, 23; Appalachian, 26; Pacific, 10; New Mexican, 1 (*Cheilanthes lanuginosa*); Tropical, 0. Twenty of the species are peculiar to North America. The second table divides the Dominion into five botanical areas, which show the following distribution of species: Atlantic Provinces and Eastern Quebec, 54; Ontario

and Western Quebec, 55; the Great Plains to the Arctic Circle, 31; Rocky Mountains, 27; British Columbia, 31.

Contributions to American Botany. XII. By Sereno Watson. Proc. Amer. Acad. XX. pp. 324–378. Issued February 21, 1885.

A history and revision of the Roses of North America fills the first half of this contribution. The history is given with that painstaking reference to the literature of the subject so characteristic of Mr. Watson, and from the account of Gosnold's voyage in 1602 to Palmer's *R. Mexicana*, discovered in 1881, we have a complete account of successive discoveries and varying opinions as to the limits and arrangement of species.

In the revision two series are recognized, the one with persistent and connivent sepals, the other with sepals deciduous and spreading. The former is subdivided into two groups, dependent on the presence or absence of infrastipular spines. The armed group are entirely western, extending no farther east than the plains east of the Rocky Mountains. The unarmed group ranges from Colorado to Alaska, and eastward to Hudson Bay and the N. Atlantic States, and may be all called *R. blanda*, or separated into four species, according to the view taken as to the limits of species. The series with deciduous sepals is more general in its distribution. Very little attempt seems to have been made to give synonymy, probably from the fact of its inextricable confusion, but an exceedingly full list of stations and collectors answers really the same purpose, especially to those who have full sets of reports on western botany. The grouping and range is as follows:

I. Sepals connivent and persistent after flowering.

A. Without infrastipular spines.

1. *R. acicularis*, Lindl. (N. Alaska) 2. *R. blanda*, Ait. (Newfoundland to Lake Superior) 3. *R. Suyi*, Schwein. (Colorado to Brit. Am. and Lake Superior) 4. *R. Arkansana*, Porter (W. Texas to Brit. Am.).

B. Infrastipular spines present.

5. *R. Nutkana*, Presl (Idaho and Oregon to Alaska). 6. *R. pisocarpa*, Gray (Oregon and Washington Terr.). 7. *R. Californica*, C. & S. (Oregon and Calif.). 8. *R. Fendleri*, Crepin (from the Rocky Mts. to the Sierras and Cascades). 9. *R. Woodsii*, Lindl. (Col. to Brit. Am. and the Mississippi) 10. *R. minutifolia*, Eng. (Lower California)

II. Sepals spreading after flowering and deciduous.

11. *R. Carolina*, L. (Nova Scotia to Florida and the Mississippi) 12. *R. lucida*, Ehrh. (Newfoundland to N. Y.) 13. *R. humilis*, Marsh. (from the Atlantic to the Mississippi) 14. *R. nitida*, Willd. (Newfoundland to New England) 15. *R. foliosa*, Nutt. (Indian Terr. to Tex.) 16. *R. Mexicana*, Watson (Mexico). 17. *R. setigera*, Mx. (Ontario to Gulf of Mexico) 18. *R. gymnocarpa*, Nutt. (Brit. Col. to W. Montana and California)

It would be possible to reduce these 18 species to 9, as follows, indicated by the numbers given above: 2 (including 1, 3, 4), 5, 9 (incl. 6, 7, 8), 10, 11, 13 (incl. 12, 14), 15 (incl. 16), 17, 18.

The rest of the contribution is given up to the description of new species, chiefly from our western territories. Quite a notable new species is a *Picea*, from 100 to 150 feet in height, discovered by Thos. Howell at high elevations in the Siskiyou Mountains of California, and dedicated to Prof. W. H. Brewer, as *P. Breweriana*.

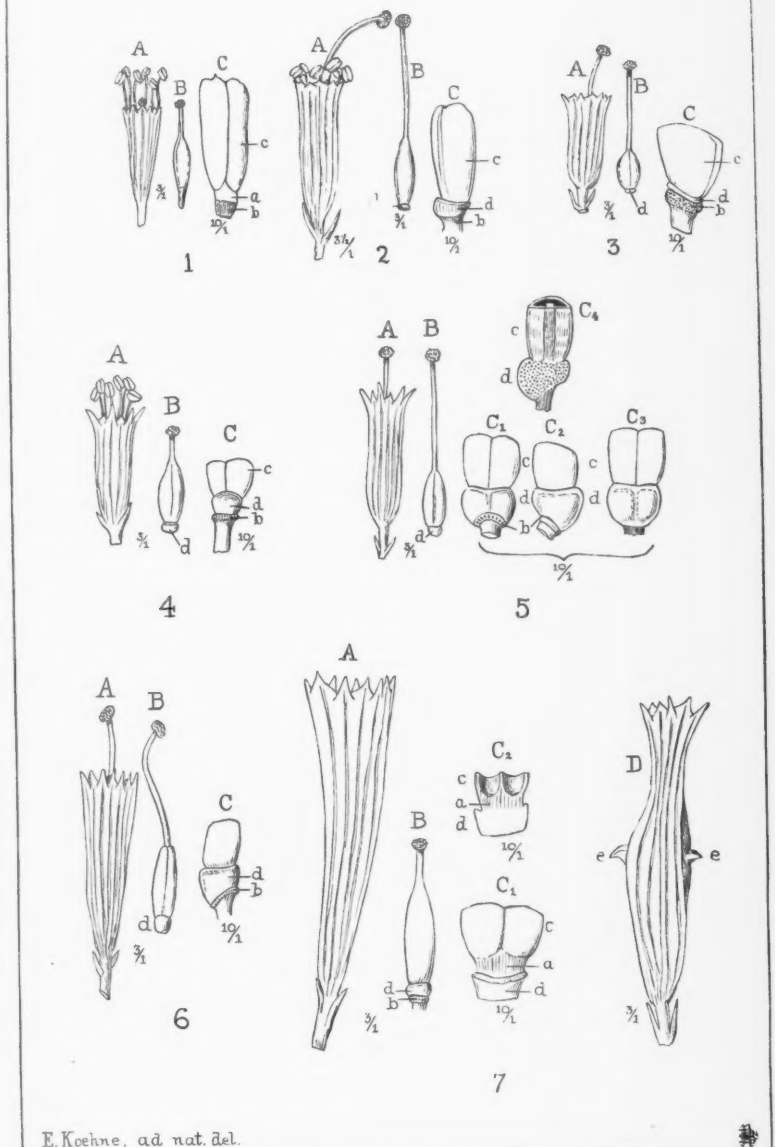
Thirty-fifth Annual Report of the New York State Museum of Natural History: Report of the Botanist. 8°. Albany, 1884. pp. 125–164.
Thirty-sixth Report of the same. Albany, 1884. pp. 29–49.

The present reports are for the years 1881 and 1882, respectively. The ne-

cessity of less tardy publication has been repeatedly urged by the friends of the museum, but without much apparent result. The public printer will not be hurried. The first of these reports contains the usual variety of interesting notes on New York plants, with descriptions of some forty-five new species of fungi, and one new genus, *Gymnascella*, related to *Ascomyces*. A very valuable feature of the report is the synopsis of N. Y. species of *Lepiota*, with full, specific descriptions and notes.

It has been the custom of Mr. Peck to make a collecting tour to some part of the state each summer, for which he advances the money and is reimbursed by an appropriation by the Legislature. Through some political intrigue this item for 1880 was vetoed by the Governor. Thinking it was not likely to occur again, he advanced the money for 1881, but again it was vetoed. He therefore did not collect in the year following, and in consequence the second of the present reports is shorter than usual and contains no new species. It has, however, a synopsis of the N. Y. species of *Psalliota*, including seven species, the common mushroom, *Agaricus campestris*, being one of them.

These reports, of which about a dozen and a half have now been issued, lose much of their value for want of an index. If a complete and accurate index could be furnished for all now published, botanists would be willing to sacrifice one of the annual reports for it, if need be.



KOEHNE ON LYTHRACEÆ.